Reviewer’s report

Title: Specification of Implementation Interventions to Address the Cascade of HIV Care and Treatment in Resource Limited Settings: a Systematic Review

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Reviewer: Sarah Chapman

Reviewer’s report:

This article addresses an important topic, how to increase intervention implementation to improve HIV care. The literature reviewed is extensive, a large amount of data has been extracted, and the authors have described several limitations with this literature that will be of interest to clinicians and groups working in this area. However, there are a number of substantial issues with the manuscript in its current form which would need to be addressed before publication.

1) The review is focused on 'implementation interventions' however it is unclear to me how the authors defined 'implementation interventions' and differentiated this from trials of interventions. In its current form, the review does not explicitly give a definition of implementation interventions and in places the term implementation intervention appears to describe any intervention which is implemented. This means that some of the identified trials are focused on the efficacy of an intervention, rather than of different ways of implementing the intervention. As reviews of interventions to increase adherence to ART or increase uptake of HIV testing are already available, the current review is less novel than if it had focused tightly on implementation interventions. In addition, because the inclusion criteria mean that some interventions that reported outcomes such as CD4 count were excluded, it is arguably less complete than some of the existing reviews that directly focus on particular parts of HIV care rather than on implementation. Moreover the inclusion criteria states that interventions targeted at system, community or organizational levels were excluded on the grounds that these are not modifiable. I'm unclear from the description how the authors define these terms, however, it would seem likely to me that some system level interventions e.g. increasing time available for training, modification of financial incentives for healthcare providers, could be implementation interventions. From the information given it therefore seems likely to me that there may be missing relevant implementation interventions. The authors should give a definition of implementation intervention, and use this to select studies, or should reframe the paper in broader terms.

2) Although the PRISMA checklist has been completed, some of the information referred to is difficult to locate as it is only in supplements or absent from the paper. I strongly recommend that the authors restructure the Method and Results section (and the rest of the paper) considering PRISMA recommendations. For example, the search strategy should include a list of databases, sample search strategy, date of search. There should be clear statement in the paper of the exact inclusion and exclusion criteria, and a rationale for this provided. I would recommend that the authors consider framing this in terms of PICOS broadly to ensure that it is clear which sorts of
interventions, outcomes and participants they focused on. Basic information, such as search dates, inclusion of unpublished studies e.g. dissertations, government reports, conference abstracts, whether authors were contacted for further information, how many people extracted data and whether they agreed on coding etc are missing from the paper. Likewise, using PRISMA to structure the Results section would enhance clarity e.g. the first section of the Results is headed 'Study Characteristics' but initially describes the search. Some of this information is included in the supplements but more should be included in the main body of the paper. Even with the addition of supplements, more information e.g. dates of search, reviews used to identify other papers, experts consulted, should be provided.

3) The authors refer throughout to using Proctor's headings to extract and code the papers. However, they do not extract information on all the points that Proctor refers to, and operationalize some of the terms recommended in the Proctor paper differently from the original recommendations. The authors should explain these differences and justify them as otherwise they are misrepresenting the original recommendations. For example, the Proctor paper recommends that 'Justification' is described. However, no mention of this is made in the current paper. Likewise, the 'action target' is described in Proctor's paper as being both the person whose behaviour the implementation seeks to change and the motivations of this person. In the current paper, the authors only focus on the later. The authors code for 'behavioural target' - I'm not clear whether this maps to the 'action' or the 'implementation outcome addressed' referred to in the original Proctor paper.

4) There is information in the Results section (E.g. whether the study reported a positive effect) which is not mentioned in the Method. This should be rectified so that the reader can fully understand the Results. For example, how did the authors judge whether there was an intervention effect? i.e. effect size, significance level, which outcome was considered when multiple outcomes were reported? Likewise, for studies that reported, for example, an intervention delivered by community workers to patients, were patients/community workers/both included in the sample size? I recommend that the Method describes how this information was coded and extracted, and also that more details are reported in the Results. For example, what outcomes were the effects positive, what type of sample was used. It would be easier to understand the sample size data if it was perhaps split into the patients, action target, and actors rather than grouped together.

5) More information should be given regarding how the intervention types were arrived at and how these were coded. For example, did each of the listed experts read a description of each intervention and then code it using pre-specified intervention labels? Were a subsample of papers used to derive these codes and then the codes used to extract information from the other papers? Was coding independent, and if so, what was the level of agreement between coders? For some of the codes, quite disparate interventions e.g. food disbursement and behavioural economics are labelled as being part of the same type of intervention approach. How were these judgements made?

6) The authors state that they just coded for presence/absence of the Proctor criteria, but do not describe how they judged this and how disagreements or difficult cases were dealt with. It seems likely to me that there were some 'grey' areas, for example for text message reminders, who
would be the intervention 'actor' as they are presumably delivered by an IT system. More information should be given on how these judgements were made to enable the reader to understand the meaning of the information in Table 3.

7) I have doubts regarding whether the authors have sufficient power to conduct a linear regression to detect the effect of the different intervention approaches on intervention reporting when some of the intervention approaches were only used by 3 or 5 interventions.

8) The section on the PCA is quite unclear and I have doubts regarding the validity of this approach. My understanding is that, to conduct PCA, the interpretation can become controversial if continuous variables are not used. Were the relevant assumptions for this analysis checked? Was there a sufficiently large sample size (I've seen 150 quoted for continuous samples) to conduct PCA? The information presented in the supplementary material shows negative relationships between some of the intervention types and the components they were grouped under- are these valid groupings under a data driven approach such as PCA? The footnote states that some components were formed 'empirically'- what information was used to make these judgements- presumably this means that PCA was not used as the final arbiter of the classifications? A scree plot value of 0.2 is given as a cut off- my understanding is that 1 is a more typical value to use- the authors should explain why they used such a low value. More globally, I'm unsure of the value of using this type of analysis to categorize interventions, as different intervention strategies e.g. food supplements and counselling could plausibly co-occur in multiple studies but would not necessarily be the same intervention type, whereas similar intervention methods e.g. two different types of patient counselling may tend to not be given in the same intervention. The authors should discuss the usefulness of classifying such a wide range of intervention strategies into a small number of categories in this way in the Introduction and Discussion.

9) From the abstract, it appears that the search was last updated in March 2014. I realise it is likely to be very time consuming but would strongly suggest that the review is updated.

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